

Mobile Phone, Display Method, and Computer Program

TECHNICAL FIELD

5 The present invention relates to technology for displaying video and information on a mobile phone.

BACKGROUND ART

10 Diversification of mobile phones has increased in recent years, with mobile phones having functions other than a call function continually appearing. These other functions includes, for example, Internet connectivity, email, audio/video (AV) email, and video calling.

15 With a conventional mobile phone, a currently operating function is interrupted before performing a subsequent function in the case where another function is activated while one of the functions is being used.

20 In this case, the screen displayed on the mobile phone changes from information related to the interrupted function to information related to the subsequent function.

25 For example, when an incoming email or call is received while the user is browsing a website with an Internet connection (i.e. Internet connectivity being used), the conventional mobile phone switches the screen displayed from information related to the website to information notifying the user that a call or email has been received.

 However, the user may find it off-putting to have the display screen switched from information related to the

current function to information related to the subsequent function when another function is activated with one of the functions currently in use. For this reason, users are calling for information related to other functions to be
5 displayed without interrupting display of information related to the current function.

In view of this, an object of the present invention is to provide a mobile phone and a display method capable of displaying video and other information in a user-friendly
10 manner without interrupting video display, in the case where other information is displayed during the display of received video.

DISCLOSURE OF THE INVENTION

15 To achieve the above object, the present invention is a mobile phone for receiving a video signal and displaying video on a screen, and includes an acquiring unit operable to acquire incoming signal information related to an incoming signal or detection information related to detection of a
20 prescribed operation by a user, a generating unit operable to generate display information related to mobile communication, and a display unit operable to generate downscaled video by downscaling the video being displayed on the screen relative to a size of the displayed video, and
25 display the downscaled video and the display information respectively in a first display area and a second display area obtained by partitioning the screen in two.

According to this configuration, the mobile phone

displays display information related to an incoming signal and video currently being displayed in different areas of the screen partitioned in two when incoming signal information or detection information is acquired, thereby
5 enabling the display information to be notified to the user without interrupting video display on the screen.

For example, if an incoming call or email is received while video constituting a TV broadcast or video call is being displayed on the screen, the mobile phone is able to display
10 information such as the telephone number of the caller or the email address of the sender related to the incoming call or email, without the display of video constituting the TV broadcast or video call being interrupted. Furthermore, if the mobile phone is constituted from an openable/closable
15 casing, and the opening of the casing by the user is detected while video constituting a TV broadcast or video call is being displayed with the casing in the closed state, the mobile phone is able to display information such as the telephone number of the caller or the email address of the sender related
20 to the incoming call or email, without the display of video constituting the TV broadcast or video call being interrupted.

Here, the incoming signal information may include ID information identifying the originator, and the generating
25 unit may generate the display information based on the ID information.

According to this configuration, the mobile phone displays the originator's ID information, being display

information related to mobile communication, and video currently being displayed in different areas of the screen partitioned in two when incoming signal information is acquired, thereby enabling the display information to be notified to the user without interrupting video display on the screen.

For example, if an incoming call or email is received while video constituting a TV broadcast or video call is being displayed on the screen, the mobile phone is able to display information such as the telephone number of the caller or the email address of the sender related to the incoming call or email, without the display of video constituting the TV broadcast or video call being interrupted.

Here, the display unit may store ratio information showing an area ratio between the first display area and the second display area, and generate the downscaled video by downscaling the video based on the ratio information.

According to this configuration, the mobile phone generates downscaled video based on the stored ratio information, and is able to display the downscaled video in the first display region and the acquired ID information in the second display area. The mobile phone is thus able to display the ID information and video using a pre-stored area ratio.

Here, the mobile phone may further receive an audio signal corresponding to the video signal, and output audio, and the mobile phone may further include a volume adjusting unit operable to adjust a volume of the audio output on

acquiring the incoming signal information, and an audio output unit operable to output or mute the audio based on the adjusted volume.

According to this configuration, the mobile phone is
5 able to adjust the volume of audio output on receipt of an incoming signal during video display, and output or mute the audio based on the adjusted volume.

Here, the acquiring unit may acquire the detection information by detecting a prescribed operation by the user
10 during video display in a standard video display orientation, and the display unit may generate downscaled/rotated video as the downscaled video by downscaling and rotating the video 90 degrees from the standard video display orientation, if the detection information is acquired.

15 According to this configuration, the mobile phone is able to generate downscaled/rotated video by downscaling and rotating the video 90 degrees, when a prescribed user operation is detected during video display on the screen, and display the display information on the screen alongside
20 the downscaled/rotated video. The mobile phone is thus able to display the display information without interrupting video display when a prescribed operation is detected during video display. Furthermore, it is possible to display the display information while protecting the displayed video
25 content at all times, by downscaling and rotating the displayed video 90 degrees from the standard video display orientation. Moreover, the user can easily view the displayed video, which is in portrait orientation on the screen when

the user is operating the mobile phone.

Here, the display unit, on receipt of new ratio information showing an area ratio between a third display area different in size from the first display area and a fourth display area obtained by partitioning the screen in two, may
5 upscale or further downscale the downscaled/rotated video based on the received ratio information, and display the downscaled/rotated video after upscaling or further downscaling in the third display area and the display
10 information in the fourth display area.

According to this configuration, the mobile phone, by receiving ratio information different from the stored ratio information, is able to upscale or further downscale the downscaled/rotated video based on the received ratio
15 information instead of displaying the display information on the screen alongside the downscaled/rotated video, and to display the display information alongside the downscaled/rotated video after upscaling or further downscaling.

20 Here, the mobile phone may further include an operation instruction receiving unit operable to receive an operation instruction from the user, a switching instruction receiving unit operable to receive a switching instruction from the user to switch an operation target, and an operation
25 switching unit operable, on receipt of the switching instruction, to switch the target of an operation based on the operation instruction, from a first function relating to display of the downscaled/rotated video to a second

function relating to the display information, or from the second function to the first function.

According to this configuration, the mobile phone, on receipt of a switching instruction from the user during display of the downscaled/rotated video and the display information on the screen, is able to switch the target of the operation based on the operating instruction. The user is thus able to operate the first function and the second function by switching the operation target.

Here, the operation switching unit may store output destination information showing one of the first function and the second function as the target of the operation based on the operation instruction, and rewrite the output destination information on receipt of the switching information, from information showing the first function to information showing the second function, or from information showing the second function to information showing the first function, and the operation instruction receiving unit may output the operation instruction to one of the first function and the second function, according to information shown by the output destination information.

According to this configuration, the mobile phone, on receipt of a switching instruction from the user, rewrites the stored output destination information from information showing the first function to information showing the second function, or from information showing the second function to information showing the first function, and the operation instruction receiving unit is able to output the operation

instruction to one of the first function and the second function according to information shown by the output destination information. The operation target can thus be switched.

5 Here, the mobile phone may further receive an audio signal corresponding to the video signal, and output audio, and the mobile phone may further include an operating instruction receiving unit operable to receive an operating instruction relating to the mobile phone, a volume adjusting
10 unit operable to adjust the volume of the audio output on receipt of the operating instruction, and an audio output unit operable to output or mute the audio based on the adjusted volume.

 According to this configuration, the mobile phone is
15 able to adjust the volume of audio output on receipt of an operating instruction from the user, and output or mute the audio based on the adjusted volume.

 Here, the mobile phone may further include two speakers disposed one on either side of the screen, and an audio output
20 unit operable to play audio included in a television broadcast signal in stereo using the two speakers when the two speakers are positioned laterally relative to the video, and in monaural using the two speakers when the two speakers are positioned vertically relative to the video.

25 According to this configuration, audio is output in stereo if the speakers are positioned laterally (i.e. on the left/right) relative to the displayed video as seen from the user, thereby enabling the user to enjoy the audio in stereo,

whereas audio is output in monaural from at least one of the speakers if the speakers are vertically positioned (i.e. a direction other than the lateral direction) relative to the displayed video, thereby enabling the user to listen to the sound without experiencing the unnaturalness and difficulty in hearing associated with listening to the right channel of stereo audio coming from above the video and the left channel of stereo audio coming from below the video.

A display method of the present invention is used by a mobile phone that receives a video signal, displays video on a screen, and includes an acquiring unit, a generating unit and a display unit. The display method includes the steps of using the acquiring unit to acquire incoming signal information related to an incoming signal or detection information related to detection of a prescribed operation by a user, using the generating unit to generate display information related to mobile communication, and using the display unit to generate downscaled video by downscaling the video being displayed on the screen relative to a size of the displayed video, and display the downscaled video and the display information respectively in a first display area and a second display area obtained by partitioning the screen in two.

According to this configuration, the mobile phone displays display information related to an incoming signal and video currently being displayed in different areas of the screen partitioned in two when incoming signal information or detection information is acquired, thereby

enabling display information to be notified to the user without interrupting video display on the screen.

For example, if an incoming call or email is received while video constituting a TV broadcast or video call is being
5 displayed on the screen, the mobile phone is able to display information such as the telephone number of the caller or the email address of the sender related to the incoming call or email, without the display of video constituting the TV broadcast or video call being interrupted. Furthermore, if
10 the mobile phone is constituted from an openable/closable casing, and the opening of the casing by the user is detected while video constituting a TV broadcast or video call is being displayed with the casing in the closed state, the mobile phone is able to display information such as the telephone
15 number of the caller or the email address of the sender related to the incoming call or email, without the display of video constituting the TV broadcast or video call being interrupted.

Here, the incoming signal information may include ID
20 information identifying an originator, and the generating step may generate the display information based on the ID information.

According to this configuration, the mobile phone displays the originator's ID information, being display
25 information related to mobile communication, and video currently being displayed in different areas of the screen partitioned in two when information related to an incoming signal or information related to an operation by the user

is acquired, thereby enabling the display information to be notified to the user without interrupting video display on the screen.

For example, if an incoming call or email is received
5 while video constituting a TV broadcast or video call is being displayed on the screen, the mobile phone is able to display information such as the telephone number of the caller or the email address of the sender related to the incoming call or email, without the display of video constituting the TV
10 broadcast or video call being interrupted.

Here, the acquiring step may use the acquiring unit to acquire the detection information by detecting a prescribed operation by the user during video display in a standard video display orientation, and the display step may use the display
15 unit to generate downscaled/rotated video as the downscaled video by downscaling and rotating the video 90 degrees from the standard video display orientation, if the detection information is acquired.

According to this configuration, the mobile phone is
20 able to generate downscaled/rotated video by downscaling and rotating the video 90 degrees, when a prescribed user operation is detected during video display on the screen, and display the display information on the screen alongside the downscaled/rotated video. The mobile phone is thus able
25 to display the display information without interrupting video display when a prescribed operation is detected during video display. Furthermore, it is possible to display the display information while protecting the displayed video

content at all times, by downscaling and rotating the displayed video 90 degrees from the standard video display orientation. Moreover, the user can easily view the displayed video, which is in portrait orientation on the screen when
5 the user is operating the mobile phone.

Here, the mobile phone may further include two speakers disposed one on either side of the screen, and an audio output unit, and the display method may further include the step of using the audio output unit to play audio included in a
10 television broadcast signal in stereo using the two speakers when the two speakers are positioned laterally relative to the video, and in monaural using the two speakers when the two speakers are positioned vertically relative to the video.

According to this configuration, audio is output in
15 stereo if the speakers are positioned laterally (i.e. on the left/right) relative to the displayed video as seen from the user, thereby enabling the user to enjoy the audio in stereo, whereas audio is output in monaural from at least one of the speakers if the speakers are vertically positioned (i.e. a
20 direction other than the lateral direction) relative to the displayed video, thereby enabling the user to listen to the sound without experiencing the unnaturalness and difficulty in hearing associated with listening to the right channel of stereo audio coming from above the video and the left
25 channel of stereo audio coming from below the video.

A computer program of the present invention is applied in a mobile phone that receives a video signal, displays video on a screen, and includes an acquiring unit, a generating

unit and a display unit. The computer program causes a computer to execute the steps of using the acquiring unit to acquire incoming signal information related to an incoming signal or detection information related to detection of a prescribed operation by a user, using the generating unit to generate display information related to mobile communication, and using the display unit to display the incoming signal information or the display information.

According to this configuration, the mobile phone displays display information related to an incoming signal and video currently being displayed in different areas of the screen partitioned in two when incoming signal information or detection information is acquired, thereby enabling display information to be notified to the user without interrupting video display on the screen.

For example, if an incoming call or email is received while video constituting a TV broadcast or video call is being displayed on the screen, the mobile phone is able to display information such as the telephone number of the caller or the email address of the sender related to the incoming call or email, without the display of video constituting the TV broadcast or video call being interrupted. Furthermore, if the mobile phone is constituted from an openable/closable casing, and the opening of the casing by the user is detected while video constituting a TV broadcast or video call is being displayed with the casing in the closed state, the mobile phone is able to display information such as the telephone number of the caller or the email address of the sender related

to the incoming call or email, without the display of video constituting the TV broadcast or video call being interrupted.

Here, the incoming signal information may include ID
5 information identifying an originator, and the generating step may generate the display information based on the ID information.

According to this configuration, the mobile phone is able to display ID information identifying the originator
10 and video in different areas of the screen partitioned in two, when an incoming signal is received during video display on the screen. The mobile phone is thus able to notify the user that an incoming call or email has been received during video display, without interrupting the video display.

15 Here, the acquiring step may use the acquiring unit to acquire the detection information by detecting a prescribed operation by the user during video display in a standard video display orientation, and the display step may use the display unit to generate downscaled/rotated video as the downscaled
20 video by downsampling and rotating the video 90 degrees from the standard video display orientation, if the detection information is acquired.

According to this configuration, the mobile phone is able to generate downscaled/rotated video by downsampling and
25 rotating the video 90 degrees, when a prescribed user operation is detected during video display on the screen, and display the display information on the screen alongside the downscaled/rotated video. The mobile phone is thus able

to display the display information without interrupting video display when a prescribed operation is detected during video display. Furthermore, it is possible to display the display information while protecting the displayed video content at all times, by downscaling and rotating the displayed video 90 degrees from the standard video display orientation. Moreover, the user can easily view the displayed video, which is in portrait orientation on the screen when the user is operating the mobile phone.

Here, the mobile phone may further include two speakers disposed one on either side of the screen, and an audio output unit, and the computer program may further cause the computer to execute the step of using the audio output unit to play audio included in a television broadcast signal in stereo using the two speakers when the two speakers are positioned laterally relative to the video, and in monaural using the two speakers when the two speakers are positioned vertically relative to the video.

According to this configuration, audio is output in stereo if the speakers are positioned laterally (i.e. on the left/right) relative to the displayed video as seen from the user, thereby enabling the user to enjoy the audio in stereo, whereas audio is output in monaural from at least one of the speakers if the speakers are vertically positioned (i.e. a direction other than the lateral direction) relative to the displayed video, thereby enabling the user to listen to the sound without experiencing the unnaturalness and difficulty in hearing associated with listening to the right channel

of stereo audio coming from above the video and the left
channel of stereo audio coming from below the video.